5e

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/656,153	09/06/2000	Kazuyuki Sakoda	7217/62588	9225

7590 02/23/2004

Jay H. Maioli
Cooper & Dunham LLP
1185 Avenue of the Americas
New York, NY 10036

EXAMINER	
PHUNKULH, BOB A	

ART UNIT	PAPER NUMBER
2661	

DATE MAILED: 02/23/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/656,153	Applicant(s) SAKODA ET AL.	
	Examiner Bob A. Phunkulh	Art Unit 2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 September 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-15,20-27,30-35,40-45 and 49-55* is/are rejected.

7)☒ Claim(s) *8-9, 16-19, 28-29, 36-39, 46, 47, and 56-57* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 September 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

Figures 22-24 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 10-15, 20-27, 30-35, 40-45, 49-55, are rejected under 35 U.S.C. 102(e) as being anticipated by Davies et al. (US 5,953,311), hereinafter Davies.

Regarding claims 1, 40, Davies discloses a transmitting apparatus for transmitting a multi-carrier modulated signal having a plurality of sub-carriers modulated in accordance with transmission data, comprising:

a mapping circuit for arranging signal points with respect to said plurality of sub-carriers in accordance with a predetermined modulation method based on said transmission data and forming a transmission signal (signal mappper 22, see figure 4),

a pilot addition circuit for inserting a transmission path estimation pilot signal in the transmission signal output from said mapping circuit (pilot carrier inserted circuit, see figure 4), and

an orthogonal transform circuit for orthogonally transforming the transmission sign4l having said pilot signal added thereto (IFFT circuit 24, see figure 4).

Regarding claims 2, 41, Davies discloses the pilot addition circuit determines a number of insertions of said pilot signal in each modulation time in accordance with an attribute of said transmission data (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 3, Davies discloses the pilot addition circuit determines a number of insertions of said pilot signal in each modulation in time in accordance with one of a size of said transmission data and a perceived importance of said transmission data (see col. 2 line 49 to col. 3 line 5).

Regarding claims 4, 42, Davies discloses the pilot addition circuit determines a number of insertions of said pilot signal in each modulation time in accordance with a state of a transmission channel (see col. 2 line 49 to col. 3 line 5).

Regarding claims 5, 43, Davies discloses the pilot addition circuit determines, a number of insertions of said pilot signal in each modulation time in accordance with a possibly of retransmission of said transmission data when a transmitting operation fails.

Regarding claims 6, 44, Davies discloses the pilot addition circuit inserts said pilot signal with a highest ratio at a start of the transmission where, when the modulated signal of each sub-carrier in one modulation time is one symbol, the ratio of the pilot signal is defined by number of pilot symbols number of information symbols (see col. 2 line 49 to col. 3 line 5).

Regarding claims 7, 45, Davies discloses the pilot addition circuit inserts said pilot signal with a every modulation time (see col. 2 line 49 to col. 3 line 5).

Regarding claims 10, 48, Davies discloses the pilot addition circuit holds a ratio of said pilot signal constant when a predetermined time elapse after a start of the transmission (see col. 2 line 49 to col. 3 line 5).

Regarding claims 11, 49, Davies discloses the pilot addition circuit stops the addition of the pilot signal when a predetermined time elapses after a start of the transmission (see col. 2 line 49 to col. 3 line 5).

Regarding claims 12, 50, Davies discloses the pilot addition circuit changes a position of insertion of said pilot signal when every modulation time while holding a ratio of the pilot signal constant (see col. 2 line 49 to col. 3 line 5).

Regarding claim 13, Davies discloses the orthogonal transform circuit performs an inverse Fourier transform on the transmission signal having pilot signal added thereto (see figure 4).

Regarding claim 14, Davies discloses a receiving apparatus for receiving a multi-carrier modulated signal having a pilot signal added thereto by a transmitting apparatus, the receiving apparatus comprising:

an orthogonal transform circuit for orthogonally transforming a received signal (FFT circuit in the receiver 32, see col. 3 lines 4-8),

a transmission path estimation circuit for extracting said pilot signal based on an output signal of said orthogonal transform circuit and estimating a transmission path in accordance with the extracted pilot signal (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59), and

a data output circuit for correcting said received signal in accordance with a result of the estimated transmission path of said transmission path estimation circuit and outputting the received signal.

Regarding claim 15, Davies disclose the transmission path estimation circuit has a transmission path equalization circuit for extracting said pilot signal from the output signal of said orthogonal transform circuit and estimating characteristics of the transmission path in accordance with the extracted pilot signal (pilot carriers are

inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59).

Regarding claim 20, Davies discloses the orthogonal transform circuit performs a Fourier transform on said received signal (see col. 3 line 4-8).

Regarding claim 20, Davies discloses a communication system for transmitting and receiving a mult-carrier modulated signal produced in accordance with transmission data, comprising:

a mapping circuit for arranging signal points with respect to said plurality of sub-carriers in accordance with a predetermined modulation method based on said transmission data (signal mapper 22, see figure 4),

a pilot addition circuit for inserting a transmission path estimation pilot signal in an output signal of said mapping circuit (pilot carrier inserted circuit, see figure 4),

a first orthogonal transform circuit for orthogonally transforming an output signal of said pilot addition circuit (IFFT, see figure 4),

a transmission circuit for transmitting an output signal from said transmission path,

a reception circuit for receiving a transmission signal from said transmission path,

a second orthogonal transform circuit for orthogonally transforming a received signal received by said reception circuit (FFT in receiver 32, see col. 3 line 4-8),

a transmission path estimation circuit for extracting said pilot signal based on the output signal of said second orthogonal transform circuit and estimating the transmission path in accordance with the extracted pilot signal (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59), and

a data output circuit for correcting said received signal in accordance with a result of estimation of said transmission path estimation circuit and outputting data of the received signal.

Regarding claim 23, Davies discloses the pilot addition circuit controls insertion of said pilot signal in accordance with an attribute of said transmission data (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 23, Davies discloses the pilot addition circuit determines a number of insertions of said pilot signal in each modulation time in accordance with one of a size of said transmission data and a perceived importance of said transmission data (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 24, Davies discloses the pilot addition circuit determines a number of insertions of said pilot signal in each modulation time in accordance with a state of a transmission channel (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 25, Davies discloses the pilot addition circuit determines a number of insertions of said pilot signal in each modulation time in accordance with a possibility of retransmission of said transmission data when a transmission operation fails (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 26, Davies discloses the pilot addition circuit inserts said pilot signal with a highest ratio at a start of transmission where, when the modulated signal of each sub-carrier in one modulation time is one symbol, the ratio of the pilot signal is defined by (number of pilot symbols/number of information symbols) (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 27, Davies discloses the pilot addition circuit reduces the ratio of said pilot signal every modulation time (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 30, Davies the pilot addition circuit holds the ratio of said pilot signal at a constant when a predetermined time elapse after the start of the transmission (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 31, Davies discloses the pilot addition circuit stops the addition of the pilot signal when a predetermined time elapses after the start of the transmission and makes the ratio zero (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 32, Davies discloses the pilot addition circuit changes a position of insertion of said pilot signal with every modulation time, while holding the ratio of the pilot signal at a constant (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 33, Davies discloses the first orthogonal transform circuit performs an inverse Fourier transform on the transmission signal having the pilot signal added thereto (IFFT circuit, see figure 4).

Regarding claim 34, Davies discloses the second orthogonal transform circuit performs a Fourier transform on the transmission signal received by the reception circuit (see col. 3 lines 4-8).

Regarding claim 35, Davies discloses the transmission path estimation circuit has a transmission path equalization circuit for extracting said pilot signal from the output signal of said second orthogonal transform circuit and estimating characteristics of the transmission path in accordance with the extracted pilot signal (see col. 2 line 49 to col. 3 line 5 and figure 4).

Regarding claim 51, Davies discloses a reception method for receiving a multi-carrier modulated signal having pilot signal added thereto by a transmitting apparatus, comprising the steps of

orthogonally transforming a received signal (the signal is then transmitted through a channel 30 and received in a receiver 32. As is well known in the art, the receiver applies an inverse of the transmission process to obtain the transmitted information. In particular an FFT is applied to demodulate the signal, see col. 3 lines 4-8);

extracting said pilot signal based on said orthogonally transformed received signal (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59),

estimating a transmission path in accordance with the extracted pilot signal,

correcting said received signal in accordance with a result of said estimation of the transmission path (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59), and

outputting the data of the received signal (see col. 3 lines 65 to col 4 line 4).

Regarding claim 52, Davies discloses estimating characteristics of the transmission path in accordance with said extracted pilot signal and correcting a phase and an amplitude of the received signal in accordance with results of said estimation of the characteristics (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59).

Regarding claim 53, Davies discloses a communication method for transmitting and receiving a multi-carrier modulated signal having a plurality of sub-carriers in accordance with transmission data, comprising the steps of:

arranging signal points with respect to said plurality of sub-carriers in accordance with a predetermined modulation method based on said transmission data (see figure 4),

inserting a transmission path estimation pilot signal in an output signal produced in said step of arranging in accordance with an attribute of said transmission data (col. 2 lines 56-66),

orthogonally transforming a transmission signal having said pilot signal added thereto, transmitting said orthogonally transformed signal over a transmission path (see col. 2 line 66 to col. 3 line 1),

receiving the transmission signal from said transmission path, orthogonally transforming a received signal,

extracting said pilot signal based on said orthogonally transformed received signal (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59),

estimating the transmission path in accordance with the extracted pilot signal, correcting said received signal (pilot carriers are inserted for use in synchronization and channel estimation in the receiver, see col. 2 lines 55-59), and

outputting the data of the received signal.

Regarding claim 54, Davies discloses a communication method set forth in claim 53, further comprising the step of inserting said pilot signal with a highest ratio at a start of the transmission where, when the modulated signal of each sub-carrier in one modulation time is one symbol, the ratio of the pilot signal is defined by (number of pilot symbols/number of information symbols) (see col. 2 lines 55-66).

Regarding claim 55, Davies discloses reducing the ratio of said pilot signal every modulation time (scattered pilot carriers are distributed throughout the symbol, and their location typically changes from symbol to symbol. They are primarily useful in channel estimation, see col. 2 lines 63-65).

Allowable Subject Matter

Claims 8-9, 16-19, 28-29, 36-39, 46, 47, 56-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications intended for entry)

Or:

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Bob A. Phunkulh** whose telephone number is **(703) 308-8251.** The examiner can normally be reached on Monday-Friday from 8:00 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor **Douglas W. Olms**, can be reach on **(703) 305-4703.** The fax phone number for this group is **(703) 872-9314.**

Bob A. Phunkulh

TC 2600
Art Unit 2661
February 19, 2004